

WHAT IS CLAIMED IS:

1. A fluid-cooled battery pack system comprising:  
a battery pack case having at least one coolant inlet and at least one  
5 coolant outlet;  
a battery pack placed in the battery pack case and provided with a  
plurality of battery modules, each including at least one cell, connected  
electrically in series or in parallel and coolant flow paths formed for each  
battery module between the adjacent modules or between the module and a  
10 battery pack structure, the coolant flow paths allowing a coolant to pass  
from the coolant inlet to the coolant outlet, and  
a coolant transport device for introducing the coolant into the  
coolant inlet, allowing it to flow through the coolant flow paths, and  
releasing it from the coolant outlet,  
15 wherein a target width of the coolant flow paths is set so that a  
variation in temperature between the battery modules caused by a  
fabrication tolerance relative to the target width of the coolant flow paths is  
maintained within a predetermined range and all the battery modules have  
a predetermined temperature or less when the coolant flows through the  
20 coolant flow paths.
2. The fluid-cooled battery pack system according to claim 1, wherein  
the target width of the coolant flow paths is set so that the coolant flow  
paths have an upper limit of a value of flow resistance or less, which allows  
25 the variation in temperature between the battery modules to be maintained  
within the predetermined range.
3. The fluid-cooled battery pack system according to claim 1, wherein  
the target width of the coolant flow paths is set so that at least one factor  
30 selected from a container material for the battery modules and battery  
input/output conditions is taken into account.
4. The fluid-cooled battery pack system according to claim 3, wherein  
the container material is a resin material.  
35
5. The fluid-cooled battery pack system according to claim 1, wherein  
spacers made of metal or resin are provided, each of which is interposed

between opposite battery modules in the battery pack case, and gaps between the battery modules formed by the spacers act as the coolant flow paths.

5      6.      The fluid-cooled battery pack system according to claim 1, wherein the battery modules in the battery pack case include a battery holder that holds the battery modules so as to be spaced at a certain distance apart, and gaps between the battery modules formed by the battery holder act as the coolant flow paths.

10

7.      The fluid-cooled battery pack system according to claim 1, wherein each of the battery modules in the battery pack case has a plurality of concave and convex portions on the sides opposed to other battery modules, and when the battery modules are connected by bringing the opposite  
15      convex portions into contact with each other, gaps between the battery modules formed by the concave portions act as the coolant flow paths.

8.      The fluid-cooled battery pack system according to claim 7, wherein the convex and concave portions of each battery module extend in a  
20      direction parallel to a flow of the coolant and form a plurality of fluid flow paths between the battery modules.

9.      The fluid-cooled battery pack system according to claim 7, wherein the convex portions of each battery module are spaced at a predetermined  
25      distance apart on the sides of the module, where connections to other battery modules are made.

10.      The fluid-cooled battery pack system according to claim 1, further comprising an upper coolant chamber located above the battery modules  
30      and a lower coolant chamber located under the battery modules in the battery pack case.

11.      The fluid-cooled battery pack system according to claim 10, wherein a difference in pressure between the upper coolant chamber and the lower  
35      coolant chamber causes the coolant to flow through the coolant flow paths.

12.      The fluid-cooled battery pack system according to claim 1, wherein

the target width of the coolant flow paths is set so that when a high load is needed, the battery modules have a maximum temperature of 55 °C or less and the variation in temperature between the battery modules is 10 °C or less.

5

13. The fluid-cooled battery pack system according to claim 1, wherein the coolant is a gaseous coolant with electrical insulating characteristics.

10 14. The fluid-cooled battery pack system according to claim 1, wherein the coolant is a liquid coolant with electrical insulating characteristics.

15. The fluid-cooled battery pack system according to claim 13, wherein the gaseous coolant is air.

15 16. The fluid-cooled battery pack system according to claim 15, wherein the coolant transport device includes a cooling fan.

20 17. The fluid-cooled battery pack system according to claim 16, wherein the cooling fan is placed at the coolant inlet and supplies fresh air into the battery pack case.

18. The fluid-cooled battery pack system according to claim 16, wherein the cooling fan is placed at the coolant outlet and draws heated air out of the battery pack case.

25